Project STUDENTSKI DOM BRUNO BUŠIĆ

Network

Earthing arrangement:	TN-S
Voltage:	400 V
Max. permissible CSA:	150.0 mm¸
CSA N / CSA Ph:	1/2
CSA tolerance:	5.0 %
Target power factor:	0.96
System frequency:	50 Hz

Circuit : Circuit1 (T1-C1-Q1) - Calculated

Upstream :
Downstream : NN-TS
Voltage : 400

Source : T1

Upstream
Upstream short-circuit power: 250 MVA
Upstream impedances: Resistance Rt: 0.0702 mOhm
Inductance Xt: 0.7021 mOhm

Transformer :

Type:	immersed-type		
Number of transformers:	1	Earthing arrangement:	TN-S
Total power:	1000 kVA	Unit power:	1000 kVA
Connection:	Delta-Star	Short-circuit voltage:	6.00 %
Source impedances:	Resistance Rt:	3.2810 mOhm	
	Inductance Xt:	10.0626 mOhm	
Ib:	1374.64 A		
IMD:	-		

Cable : C1

Length: 5.0 m
Installation method: F-touching, in a ribbon cable
Single-core cables on perforated horizontal shelves

Cable type:	Single-core	Number of layers:	1
Insulation:	PVC	Nb additional touching circuits:	0
Arrangement of conductors:	Trefoil		
Ambient temperature:	40 °C	THDI level:	0 %

Permitted current by the cable (Iz):

Iz under normal conditions of use (A):	2267.4 A
Iz x correction factors (real conditions of use):	1383.1 A

Sizing constraint: overloads

Correction :	Temperature	: 0.87	(52-D1)
	x Soil thermal resistivity	: 1.00	(A.52-16)
	x Neutral loaded	: 1.00	(D.52-1)
	x touching conductors	: 0.70	(52-E1)
	x User	: 1.00	
	/ Protection)	: 1.00	(§433.1)
		0.61	

CSA (mm²)	theoretical	used	reference	metal
Per phase	10 x 137.3	10 x 150.0		Aluminium
Neutral	5 x 150.0	5 x 150.0		Aluminium
PE	1 x 150.0	1 x 150.0		Copper

Voltage drop	upstream	circuit	downstream
ΔU (%)	0.00	0.0721	0.07

Calculation results:

	Isc upstr.	Ik3max	Ik2max	Ik1max	Ik2min	Ik1min	I fault
(kA)		**22.4488**	**19.4412**	**22.1809**	**17.5804**	**20.0356**	**19.2462**
R (mΩ)		3.4493	6.8986	3.6453	6.9378	3.7042	4.2093
X (mΩ)		10.8047	21.6093	10.8847	21.6093	10.8847	11.2047
Z (mΩ)		11.3419	22.6838	11.4789	22.6957	11.4977	11.9693

Calculation results in accordance with guide UTE C15-500 (CENELEC report R064-003).
UTE approval 15L-602.
All assumptions and device choices are the user's responsibility.

Circuit breaker: Q1

Name:	NT16H1-42.0 kA	Frame rating (In):	1600 A
Trip unit rating:	1600.00 A	Trip unit:	Micrologic 5.0 A
Number of poles:	4P3d+Nr		
Discrimination limit:			
BC reinforced by cascading:			
Earth leakage protection:	No		
Earth leakage protection device :	-		
Sensitivity :	-		
Delay :	-		

Settings:

Overload:	Ir = 0.90 In = 1440.00 A
Magnetic:	Im(Isd) = 10.0 x Ir = 14400.00 A
	tm = 50 ms

Circuit : **NN-TS (NN-TS) - Calculated**

Upstream :	Circuit1
Downstream :	Circui2
Voltage :	400

Busbars: **NN-TS**

Designation:	Linergy 1600	Dimensions:	1.0 m-1// 0.0 mmx0 mm
Type :		Metal:	Copper
Ambient temperature:	35 °C	I available:	1600 A
Short-circuit temperature:	85 °C	Isc max:	22.45 kA
Ks :	1.00	Peak Isc (kÂ) :	47.14 kA
Voltage drop:	0.0642 %		

Circuit : **Circui2 (Q15-C15) - Calculated**
Upstream : NN-TS
Downstream : (GRP)
Voltage : 400

Fuse: **Q15**

FCU designation:	-	FCU rating:	-
FCU type:	-		
Number of poles:	4P3F		
Fuse model:	gG		
Fuse rating:	500.00 A	Rating of the neutral fuse	500.00 A
Fuse type (standard):	-	Fuse size: gG	
Discrimination:	T		
Earth-leakage protection:	No		
Earth-leakage protection designation:		-	
Sensitivity :		-	
Time-delay setting:		-	

Cable : **C15**

Length:	100.0 m		
Installation method:	D-mechanical protection; circuits 0.5m apart Multi-core cables directly buried		
Cable type:	Multi-core	Number of layers:	1
Insulation:	PVC	Nb additional touching circuits:	0
Arrangement of conductors:	Trefoil		
Ambient temperature:	40 °C	THDI level:	0 %

Permitted current by the cable (Iz):
Iz under normal conditions of use (A): 889.0 A
Iz x correction factors (real conditions of use): 497.8 A

Sizing constraint: overloads
Correction :

Temperature	: 0.77	(52-D2)
x Soil thermal resistivity	: 1.00	(A.52-16)
x Neutral loaded	: 1.00	(D.52-1)
x touching conductors	: 0.80	(52-E2)
x User	: 1.00	
/ Protection)	: 1.10	(§433.1)
	0.56	

CSA (mm²)	theoretical	used	reference	metal
Per phase	5 x 137.7	5 x 150.0		Aluminium
Neutral	5 x 137.7	5 x 95.0		Aluminium
PE	5 x 75.0	5 x 95.0		Aluminium

Voltage drop	upstream	circuit	downstream
ΔU (%)	0.14	0.9809	1.12

Calculation results:

	Isc upstr.	Ik3max	Ik2max	Ik1max	Ik2min	Ik1min	I fault
(kA)	**22.4488**	**17.4729**	**15.1319**	**12.6300**	**12.9576**	**10.0919**	**10.1959**
R (mΩ)	3.4758	7.3972	14.7944	13.8114	17.8244	17.7237	17.4885
X (mΩ)	10.9547	12.5547	25.1093	14.6847	25.1093	14.3847	14.3047
Z (mΩ)	11.4929	14.5719	29.1436	20.1592	30.7926	22.8265	22.5936

Calculation results in accordance with guide UTE C15-500 (CENELEC report R064-003).
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Load

I:	455.80 A	Polarity of circuit:	3P+N
P:	299.99 kW	Earthing arrangement:	TN-S
Power factor	0.95	Phase distribution:	-
		Ku:	1.0
Number of identical circuits:		1	

Circuit : **(GRP) (GRP) - Calculated**
Upstream : Circui2
Downstream : Circuit4
Voltage : 400

Busbars: **GRP**

Designation:	Linergy 630	Dimensions:	0.0 m-1// 0.0 mmx0 mm
Type :		Metal:	
Ambient temperature:	35 °C	I available:	630 A
Short-circuit temperature:	85 °C	Isc max:	17.47 kA
Ks :	1.00	Peak Isc (kÂ) :	34.95 kA
Voltage drop:	0.0000 %		

Circuit : **Circuit4 (Q5-C5) - Calculated**
Upstream : (GRP)
Downstream : RP-4K/2
Voltage : 400

Fuse: **Q5**

FCU designation:	-	FCU rating:	-
FCU type:	-		
Number of poles:	3P3F		
Fuse model:	gG		
Fuse rating:	100.00 A	Rating of the neutral fuse	100.00 A
Fuse type (standard):	-	Fuse size: gG	
Discrimination:	T		
Earth-leakage protection:	No		
Earth-leakage protection designation:		-	
Sensitivity :		-	
Time-delay setting:		-	

Cable : **C5**

Length:	50.0 m		
Installation method:	E-circuits spaced out Multi-core cables on perforated horizontal shelves		
Cable type:	Multi-core	Number of layers:	1
Insulation:	PVC	Nb additional touching circuits:	0
Arrangement of conductors:	Trefoil		
Ambient temperature:	40 °C	THDI level:	0 %

Permitted current by the cable (Iz):
Iz under normal conditions of use (A): 157.7 A
Iz x correction factors (real conditions of use): 124.6 A

Sizing constraint: user-defined
Correction :

Temperature	: 0.87	(52-D1)
x Soil thermal resistivity	: 1.00	(A.52-16)
x Neutral loaded	: 1.00	(D.52-1)
x touching conductors	: 1.00	(52-E4)
x User	: 1.00	
/ Protection)	: 1.10	(§433.1)
	0.79	

CSA (mm²)	theoretical	used	reference	metal
Per phase	1 x 32.7	1 x 50.0		Copper
Neutral	1 x 32.7	1 x 50.0		Copper
PE	1 x 16.0	1 x 25.0		Copper

Voltage drop	upstream	circuit	downstream
ΔU (%)	1.12	0.8381	1.96

Calculation results:

	Isc upstr.	Ik3max	Ik2max	Ik1max	Ik2min	Ik1min	I fault
(kA)	**17.4729**	**8.2815**	**7.1720**	**4.5741**	**5.3070**	**3.2615**	**2.4260**
R (mΩ)	7.3972	25.9072	51.8144	50.8314	67.5003	66.9910	92.2995
X (mΩ)	12.5547	16.5547	33.1093	22.6847	33.1093	22.3847	22.3047
Z (mΩ)	14.5719	30.7448	61.4895	55.6635	75.1832	70.6319	94.9563

Calculation results in accordance with guide UTE C15-500 (CENELEC report R064-003).
UTE approval 15L-602.
All assumptions and device choices are the user's responsibility.

Load

I:	86.60 A	Polarity of circuit:	3P+N
P:	57.00 kW	Earthing arrangement:	TN-S
Power factor	0.95	Phase distribution:	-
		Ku:	1.0
Number of identical circuits:		1	

Circuit : **RP-4K/2 (RP-4K/2) - Calculated**

Upstream :	Circuit4
Downstream :	Rasvjeta
Voltage :	400

Busbars: **RP-4K/2**

Designation:	Linergy 630	Dimensions:	5.0 m-1// 0.0 mmx0 mm
Type :		Metal:	
Ambient temperature:	35 °C	I available:	630 A
Short-circuit temperature:	85 °C	Isc max:	8.28 kA
Ks :	1.00	Peak Isc (kÂ) :	14.08 kA
Voltage drop:	0.0062 %		

Circuit : **Rasvjeta (Q19-C19-(1)) - Calculated**
Upstream : RP-4K/2
Downstream :
Voltage : 400

Fuse: **Q19**

FCU designation:	-	FCU rating:	-
FCU type:	-		
Number of poles:	2P1F		
Fuse model:	gG		
Fuse rating:	10 A	Rating of the neutral fuse	2.00 A
Fuse type (standard):	-	Fuse size: gG	
Discrimination:	T		
Earth-leakage protection:	No		
Earth-leakage protection designation:		-	
Sensitivity :		-	
Time-delay setting:		-	

Cable : **C19**

Length:	15.0 m		
Installation method:	B2-buried in walls Multi-core cables in profiled ducts		
Cable type:	Multi-core	Number of layers:	1
Insulation:	PVC	Nb additional touching circuits:	0
Arrangement of conductors:			
Ambient temperature:	40 °C	THDI level:	-

Permitted current by the cable (Iz):

Iz under normal conditions of use (A):	16.7 A
Iz x correction factors (real conditions of use):	11.0 A

Sizing constraint: overloads

Correction :	Temperature	: 0.87	(52-D1)
	x Soil thermal resistivity	: 1.00	(A.52-16)
	x Neutral loaded	: 1.00	(D.52-1)
	x touching conductors	: 1.00	(52-E1)
	x User	: 1.00	
	/ Protection)	: 1.31	(§433.1)
		0.66	

CSA (mm²)	theoretical	used	reference	metal
Per phase	1 x 1.2	1 x 1.5		Copper
Neutral	1 x 1.2	1 x 1.5		Copper
PE	1 x 1.5	1 x 1.5		Copper

Voltage drop	upstream	circuit	downstream
ΔU (%)	1.96	0.2086	2.17

Calculation results:

	Isc upstr.	Ik3max	Ik2max	Ik1max	Ik2min	Ik1min	I fault
(kA)	**8.2815**			**0.6034**		**0.4028**	**0.4368**
R (mΩ)	25.9869			421.1908		571.3947	526.7354
X (mΩ)	16.7047			25.6847		25.0847	25.0047
Z (mΩ)	30.8928			421.9732		571.9451	527.3286

Calculation results in accordance with guide UTE C15-500 (CENELEC report R064-003).
UTE approval 15L-602.
All assumptions and device choices are the user's responsibility.

Load

I:	1.14 A	Polarity of circuit:	1P
P:	0.25 kW	Earthing arrangement:	TN-S
Power factor	0.95	Phase distribution:	
Start-up current (A)	1.14 A	Ku:	1.0
Number of identical circuits:		1	

Circuit : **Utiènica (C7-Q7-(10)) - Calculated**
Upstream : RP-4K/2
Downstream :
Voltage : 400

Fuse: **C7**

FCU designation:	-	FCU rating:	-
FCU type:	-		
Number of poles:	2P1F		
Fuse model:	gG		
Fuse rating:	16.00 A	Rating of the neutral fuse	16.00 A
Fuse type (standard):	-	Fuse size: gG	
Discrimination:	T		
Earth-leakage protection:	No		
Earth-leakage protection designation:		-	
Sensitivity :		-	
Time-delay setting:		-	

Cable : **Q7**

Length:	15.0 m		
Installation method:	B2-buried in walls Multi-core cables in profiled ducts		
Cable type:	Multi-core	Number of layers:	1
Insulation:	PVC	Nb additional touching circuits:	0
Arrangement of conductors:			
Ambient temperature:	40 °C	THDI level:	-

Permitted current by the cable (Iz):
Iz under normal conditions of use (A): 22.7 A
Iz x correction factors (real conditions of use): 17.9 A

Sizing constraint: overloads
Correction :

Temperature	: 0.87	(52-D1)
x Soil thermal resistivity	: 1.00	(A.52-16)
x Neutral loaded	: 1.00	(D.52-1)
x touching conductors	: 1.00	(52-E1)
x User	: 1.00	
/ Protection)	: 1.10	(§433.1)
	0.79	

CSA (mm²)	theoretical	used	reference	metal
Per phase	1 x 1.9	1 x 2.5		Copper
Neutral	1 x 1.9	1 x 2.5		Copper
PE	1 x 2.5	1 x 2.5		Copper

Voltage drop	upstream	circuit	downstream
ΔU (%)	1.96	1.1027	3.06

Calculation results:

	Isc upstr.	Ik3max	Ik2max	Ik1max	Ik2min	Ik1min	I fault
(kA)	**8.2815**			**0.9282**		**0.6262**	**0.6583**
R (mΩ)	25.9869			273.1108		367.0443	349.0394
X (mΩ)	16.7047			25.6847		25.0847	25.0047
Z (mΩ)	30.8928			274.3159		367.9005	349.9339

Calculation results in accordance with guide UTE C15-500 (CENELEC report R064-003).
UTE approval 15L-602.
All assumptions and device choices are the user's responsibility.

Load

I:	10.03 A	Polarity of circuit:	1P
P:	2.20 kW	Earthing arrangement:	TN-S
Power factor	0.95	Phase distribution:	Phase1/Neutral
		Ku:	1.0
Number of identical circuits:		1	